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**PRESERVATION OF TENGGER TRIBE YARD LANDSCAPE IN THE
ENCLAVE OF BROMO TENGGER SEMERU NATIONAL PARK,
INDONESIA**

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Abstract

The Tengger Settlement in Ngadas and Ranu Pani villages is a unique settlement as a part of BromoTengger Semeru National Park (BTSNP). But the conversion of its land has become a problem in the management and can threaten the existence of its yard. This study aims to analyze the facade of the yard, as well as formulate its preservation model based on Tengger cultural wisdom. The research method applied in this study is rationalistic approach of quantitative and qualitative mix. Data were collected by applying explorative survey methods and interviews. Index of cultural significance from Turner is employed in analyzing the utilization of plant species quantitatively. The result indicates that yard performances in these two villages are categorized into narrow and medium size, with an average area of 104 m². Back and side zones are functioned as cultivation of food crops, horticultures, herbs, spices and starches (carbohydrate sources). Plants of strata I and II dominate the yards of these villages and correlate with the carrying capacity of narrow garden yards. The management of the yard in Ngadas and Ranu Pani villages through the conservation and realization of local wisdom has great potential in the preservation of the BTSNP landscape.

Keywords: Yard; Ngadas; Ranu Pani; Conservation; Landscape

Introduction

Yard is a plot of land owning certain limits, on which there are residential buildings and having functional links economically, biophysically, and socioculturally with its inhabitants [1]. Yard is able to display the identity of a community culture. One of the most important benefits of the yard is to provide food and nutritional needs of the family by planting various types of plants in the effort to increase family food's diversity Furthermore, with many benefits gained from a yard is also called a living barn, living stall, and living pharmacy [2-3].

The beautiful environmental conditions with yards planted with various Tengger Tribe plant species in Ngadas and Ranu Pani villages are very close to the landscape [4-6]. Tengger Tribe is an entity - a community that has existed since the time King Airlangga came to power in the 6th century AD. They occupied Tengger Mountains long before BTSNP was set. As a community that has settled in the area, they possess a philosophy of life expressed in the teachings of life attitude, *sesanti panca setia* (five pieces of loyalty advice), namely: (i). *setyakultural* means obedient, diligent, independent; (ii). *setya wacana* means faithful to speech; (iii). *setyasemaya* means faithful to the agreement; (iv). *Setya laksana* means obedience; and (v). *setyamitra* means faithful companion.

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In everyday life, Tengger Tribe implements a very simple, peaceful and economical living habit. They are also diligent. Their lives are very close to the customs and the tradition. Tengger tribe owns almost no art products but is rich in traditional ceremonies [6], such as: (1) *Yadnya Kasada*; (2) *Karo*; (3) *Unan-unan - Pancawarsa*; (4) *Entas-entas*; (5) *Pujan Mubeng*; (6) Birth; (7) *Tugel Kuncung*; (8) Marriage; (9) Death; (10) *Barikan*; (11) *Leliwet*; (12) and other ceremonies. The pattern of their socio-cultural life is derived from cultural value, religion and local custom which is a form of local intelligence and wisdom values in the utilization of yard space and environmental maintenance, which is interesting to be studied [7].

Culturally, Tengger tribe still holds a strong agrarian image, and has not been trapped in the culture of consumerism, materialism, and hedonism [6]. This is an indicator that Tengger Tribe still inherits and perpetuates the tradition of its predecessor. The attractiveness of Tengger tribe lies not only in the breathtaking BTSNP landscape but also in the distinctiveness of the religious status and customs of its people. Therefore, "Tengger" is a cultural landscape that if properly managed, its existence will make a significant contribution not only to itself but also to Indonesia as a nation [6].

On the other hand, Susanti in her research (2014) said that the influence of tourism activities in BTSNP region has brought out imperfect conservation efforts of the yard and the area. Singh et al [8] also said that promoting tourism in unplanned manner in hot spot biodiversity area are some of the factors causing threat to protected areas. In addition, a number of studies indicate many advantages of yard for family life to achieve family welfare from economic, physical and mental aspects [1-2, 8-9]. This study is based on the lack of conservation efforts of rural yard landscapes in Indonesia, while a number of studies indicate the many benefits of the yard for family life to achieve family welfare from the economic, physical and mental aspects [1-2, 8-9]. Therefore, this research attempts to formulate the concept and strategy of Tengger Tribe landscape conservation in BTSNP enclave. Arifin [10] stated that Indonesia was recently faced with a number of major problems in urban and rural areas. It appears that habitat loss due to increased anthropogenic activity has a larger promoter of damage to bioresources diversity.

Methods

The research was conducted in 2016 in Ngadas and Ranu Pani villages which are the enclave area of BTSNP, East Java Province, Indonesia (Fig. 1). The topography condition is hilly villages and located below the foot of Mount Bromo with an altitude of 2200 meters above sea level and is also an entrance for mountain climbers of Bromo and Semeru. The research method applied is a rationalistic approach with a mix of quantitative and qualitative analysis. This study aims to analyze the façade of the yard, and formulate the model of preserving the yard by maintaining the characteristic of Tengger Tribe culture. The samples were taken purposively in both villages based on Arifin [11-12] classification of narrow size: <120 m² and medium: 120-400m².

The data in this study are grouped into; (1) socio-cultural; (2) physical (position against the house, shape of yard: strip, block, its location to the building, and yard element; yard zone: front, left side, right side, and back); (3) vegetation (structure, function, and stratification of plants in the yard: ground cover, shrub, trees, according to 5 stratum height: strata I (0 - 1m), strata II (1 - 2m), strata III (2 - 5m), strata IV (5 - 10m), strata V (> 10m), and eight categories: ritual plants, ornamental plants, fruit plants, vegetable plants, spice plants, medicinal plants, industrial plants, and others); and (4) the perception of resident/owner. The effect of yard fragmentation existing because of the inheritance system is traced to ascertain changes in the structure and function of plants in the yard. The analysis of existing landscape condition of the yard was exercised by survey technique and sketch as well as statistical data delineated from aerial photograph. Subsequently, the image was interpreted with qualitative analysis techniques.

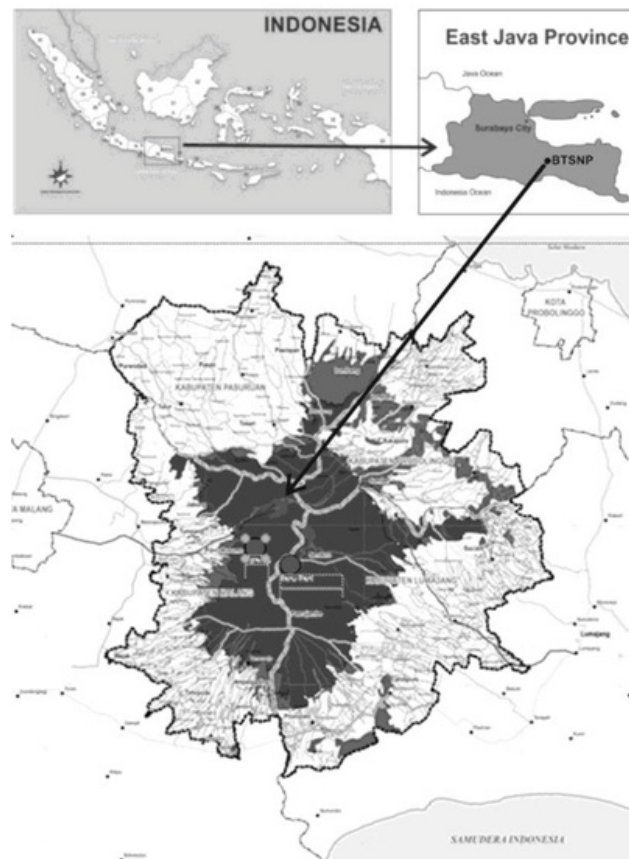


Fig. 1. Position and location of Desa Ngadas and Ranu Pani in BTSNP area

The results were compositely formulated through a discussion forum with Tenggerese community at BTSNP enclave village as stakeholders.

Results and Discussions

Traditional Tenggerese people possess socializing facilities in the form of traditional ceremonies. In the life of Tengger Tribe, there is almost no day without ceremonies of Hindu religion. The village is controlled by a teaching, commonly referred to as *Desa - Kala - Patra* which means: an orderly atmosphere to be adapted to local circumstances. In this case, the custom of Tengger society has become the inner fence of the people for the sake of maintaining the ancestral heritage of the relationship between man and man, man with his environment, and man with the Creator, through a traditional ceremony held at Mount Bromo²¹ and Sand Sea. This is in line with the view of Sutarto [13] which states that they use the area of Sand Sea and Mount Bromo as the location of traditional ceremonies such as *Yadnya Kasada*, *Mendhak Tirta*, and *Kenduri Ritual*.

They have long carried out strategies, adaptation techniques, management techniques, cultivation techniques, production techniques, and traditional medicine techniques for the utilization of biodiversity of both plants and animals (ethnobiology) in accordance with the natural environment. The establishment of zonation at BTSNP resulted in the splitting of Tengger tribe's position into Tengger people inside BTSNP, Tengger people who are on the edge or buffer area of BTSNP, and Tenggerese outside conservation area. The management of the traditional utilization zone is prioritized for Tengger Tribe who reside in the villages of

Ngadas and Ranu Pani as villages located within the area (BP BTSNP, 2015).

Until now the so-called "Tengger villages" are the 16 villages in the 4 districts (Malang, Probolinggo, Pasuruan and Lumajang) which are predominantly Hindu and still adhere to the customs. From the above villages, there are two villages in BTSNP enclave, namely Ngadas Village - Malang Regency (Fig. 2) and Ranu Pani Village - Lumajang Regency (Fig. 3). They are homogenous in social life, economy and culture. The uniformity of territory forms a kinship system which, in marriage system, is endogamy. The pattern of socio-cultural life is derived from the religious, cultural, and customary values that shape the local intelligence and wisdom in the utilization of space and the preservation of environment. The elegance and uniqueness of Ngadas and Ranu Pani lie not only on their beautiful landscapes but also on the diversity of their customs and cultures. They are able to maintain their culture in the midst of globalization. Both villages own steep slope topography, yet people can make use of it as agricultural land with appropriate soil cultivation and planting patterns, such as: polyculture cropping systems, by planting corn on the sidelines of cabbage plants, and making the waterways vertically on steep fields to avoid landslides.

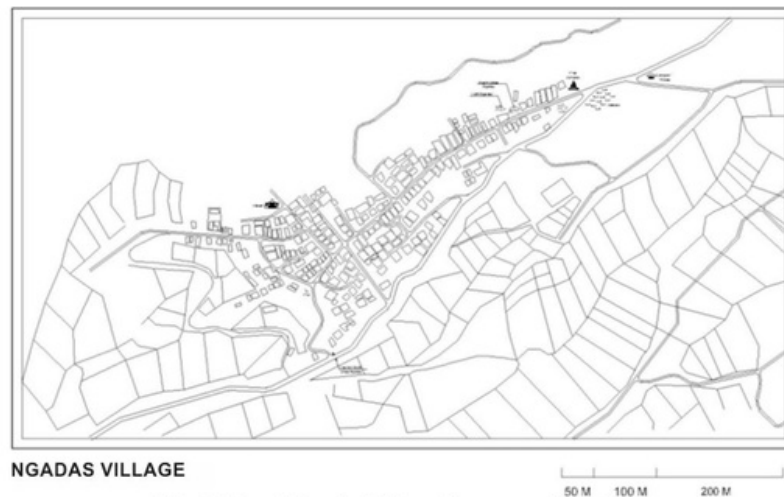


Fig. 2. Map of Ngadas Village (Source: authors, 2016)



Fig. 3. Map of Ranu Pani Village (Source: authors, 2016)

Tengger settlement neighborhood in Ngadas and Ranu Pani was originally formed from a group of houses located in the middle of fields, which were their yards. The pattern of neighborhood housing community is a group of farming families in the middle of moors on the slopes of the mountains with orientation towards the sacred places. The center of the village neighborhood is Mount Bromo and the center of the residential neighborhood is *pundhen* or *sanggar pamujan* located close to housing complex (Fig. 4).



Fig. 4. Environment expression of Ranu Pani Village (Source: authors, 2016)

Tengger settlements in the villages of Ngadas and Ranu Pani are built either adjacent or clustered to a site, where the site is selected on a flat area, near the water, not close to air disturbance (if it is possible) or terraced area. Their houses used to have a large size, including the yard, because at that time the house was inhabited by several families together.

House for Tengger Tribe is not merely a physical container, nor is it the shape of the roof, the structure-construction, or the mass of the building but is a space concept based on their belief viewing that nature controls man and man integrates with nature. Thus, the space within Tengger Tribe's architecture actually plays a role to fulfill the functions of man in nature and is subject to His laws. So, yard in the concept of Tengger Tribe's architecture becomes a subject that has its own identity and not only as a supporter of the house object in the middle. The house is an asset surrounded by other assets (yards) that are valuable and contain both material and spiritual value.

The vegetation utilized by Tengger Tribe for various purposes in its life amounts to 309 species, which can be recognized in the yard, surrounding land, settlements and conservation forest around it [4]. In Tengger society, plants play a role in traditional ceremonial activities and are widely cultivated in the yard. This action is a form of local intelligence and wisdom because plants in their habitats have started to be difficult to locate. Land management and biological resources by Tengger community are not only influenced by history and customs but also conditions of natural resources, soil fertility, planting techniques and work ethic. Their local intelligence and wisdom provide many valuable opportunities for us to understand the ecological aspects of the landscape of mountain lands and the utilization of biodiversity, where this information will help us in understanding the landscape history, landscape changes and past, present and future vegetation patterns (Fig. 5).



Fig. 5. Environmental conditions in Ngadas Village (Source: authors, 2016)

Biophysical Yard

Tengger Tribe yard pattern in the village of Ngadas and Ranu Pani is generally divided into two, namely the yard pattern on the side of the road and the yard pattern on the inside. The yard pattern on the side of the main road consists of houses facing and lined along the road. While the pattern of inner yard in general consists of houses clustered and jostled one another facing open space. The inner yard pattern is influenced by the existing inheritance system of Tenggerese culture which leads to fragmentation of the yard or the construction of new houses for offspring, which generally surround the open spaces (Fig. 6).

One of the capital management of the yard is size. According to Arifin et al. [12] there are 4 types of yard size: narrow ($<120\text{m}^2$), medium ($120\text{-}400\text{m}^2$), large ($400\text{-}1,000\text{m}^2$), and extra large ($>1000\text{m}^2$). Each house in the villages of Ngadas and Ranu Pani owns different shape and size of yard area. The largest size of yard is in the village of Ranu Pani (217.3m^2), while the most narrow size is in Ngadas village (16.24m^2). The average extent has not been able to accommodate various plants of different strata and functions because it does not meet the critical minimum size of 100m^2 [12]. The size of narrow garden yard results in imperfect diversification of plants.

Based on the result of yard size classification, it is discovered that 53% of the yard in Ranu Pani ranges from narrow to moderate. 87.2% of the yard in Ngadas village is narrow. In accordance to that, the average size of yard in the village of Ranu Pani and Ngadas is narrow. The narrowest size can be encountered in Ngadas village which is 16.24m^2 . While according to Arifin et al. [12], the size of yard is more affected by the demographic factor than the elevation of location. Furthermore, Arifin et al. [12] and Kehlenbeck et al. [14] considered the low rate of population development in rural areas to be correlated with the size of large yard, or vice versa. But the results of this study do not indicate both phenomena. It is estimated that this occurs because the villages of Ngadas and Ranu Pani are in the BTSNP pockets which have a lot of limitation in land use. The narrow size of yards in Ngadas and Ranu Pani becomes a natural occurrence in line with the increasing demand of community. The conditions in which the yard area is very limited for agricultural activities are being wisely responded by applying verticulture techniques.



Fig. 6. Utilization of yard in Ngadas village and Ranu Pani village (Source: authors, 2016)

Patterns of land use and socio-cultural conditions of Tengger tribe affect zoning yard, where from the layout can be grouped into front zone, side (right and left) zone, and back zone. The position and orientation of house yield implications on the zoning variant of the yard. Based on the results of the study, it is discovered that yard with a front zone is dominant in villages of Ranu Pani (74%), and Ngadas (66%). In both villages, the front zone of the yard is an important place for various Tenggerese social, cultural, and religious activities.

The backyard zone is relatively more common in Ranu Pani village although it does not reach 1/2 of the existing yards. The least backyard zone is encountered in Ngadas village (30%). The existence of back zone is often sacrificed to extend the house or be inherited to the offspring to build a new house. Meanwhile, the side zones are mostly discovered in RanuPani Village (47% left and 23% right), while the least can be found in Ngadas village (33% left and 25% right). In the villages of Ngadas and Ranu Pani, the side zones of the yard are planted with various horticultural crops, as well as poultry cages. The front zone is filled with various ornamental plants to accentuate the house aesthetically, while the back zone is planted with many starch-producing plants. The utilization of front, side, and back zone of yard in Ranu Pani and Ngadas village is still aimed at cultivation of food crops and horticulture.

Yard Element

The existence of elements in the yard is influenced by custom or habit of performing ceremonies existing in the area. This study ascertains that strata I plants (canopy height <1 meter) are dominant in Ngadas and Ranu Pani villages, followed by strata II plants. The percentage of strata I plantation diversity in Ranu Pani is 43% while in Ngadas is 45% of the

population at each location. The yard in Ranu Pani Village owns various plants (22 species). Next, the percentage of strata II plantation diversity in Ranu Pani Village is 22% while in Ngadas village is 24%. The yard in Ranu Pani Village owns the most diverse strata II plants (24 species). The percentage of strata III plantation diversity in Ranu Pani Village is 17% while in Ngadas village is 15%. And then the percentage of strata IV plantation diversity in Ranu Pani Village is 7% while in Ngadas village is 5%. Lastly, the percentage of strata V plantation diversity in the villages of Ranu Pani and Ngadas is 5% and 4% respectively.

The performance of plant strata in two villages above correlates with the size of the yard (small and medium-sized). The most diverse species of yard can be noticed in Ranu Pani (32 species). The medium-size yard (106-257m²) will be able to accommodate the existence of strata V plants [11-12]. Therefore, the yard in the village of Ngadas and Ranu Pani can be optimized for cultivation of strata I, II, and III plants. The diversity of yard plants in Ngadas and Ranu Pani reinforces the research results of *Pramita et al* [5] stating that the highest value plant is edelweiss (*Anaphalis longifolia*) with fidelity level of 96%. In Tenggerese society, edelweiss is very substantial for the purposes of traditional ceremonies and they interpret it as a symbol of the descending of revelation (*tanalayu*). In the ceremony of *Yadnya Kasada*, *Sesanding*, and *Entas-entas*, edelweiss becomes one of the obligatory objects of offerings in traditional ceremonies. Edelweiss flower is also a primary object in the making of *Petra* (puppet that serves as *pelelingih atman*: a place to post ancestral spirits invited in a religious ceremony). Next is *Oryza sativa* plant with a fidelity level of 94%, and then *Solanum tuberosum* has a value of 90% and possesses significant meaning in traditional ceremonies. *Allium fistulosum* is 86%, *Buddleja asiatica* 84%, *Brassica oleracea* 80%, *Fuchsia magellanica* 78%, *Moses paradisica* 74%, *Curculigolatifolia* 70%, *Cosmos caudatus* 68%, *Areca catechu* and *Ficus benjamina* 46%, *Engelhardiaspicata* 40%, *CocosNucifera* 30%, *Piper betle* 28%, and *Zea mays* 24%.

The biodiversity of the yard in Ngadas village is less than the biodiversity in Ranu Pani with 19 species and 32 species respectively. The biodiversity in Ranu Pani is higher because the average size of the yard is bigger. In addition to that, it is also supported by the environmental conditions. Based on the criteria of *Arifin et al.* [12] the number of ornamental plant species in the two villages is the most widespread of all the functions of yard plants. The percentage of ornamental plants in the village of Ranu Pani and Ngadas is relatively similar at about 21%. However, the number of species of ornamental plants in Ngadas village is less (13 species) than in Ranu Pani Village (19 species). Meanwhile, the percentage of medicinal plants in Ranu Pani Village is rather high, although only 8% and 3% of the existing plant population. For the yards in Ngadas village, the percentage of horticulture and vegetable crops is 13%, while the percentage of spices is 11% and the percentage of starch-producing plants is 14%, which are slightly higher than Ranu Pani Village. The yards in Ranu Pani Village own the percentage of horticulture, vegetables, and fruits of 22% and other functions of 7% which are higher than the yard in Ngadas village.

At the front yard zone, the existence of ornamental plants is the most diverse. Ornamental plants that can be encountered in both villages include fennel flower (*Foeniculumvulgare*), edelweiss (*Anaphalis longifolia*), mentigi (*Vacciniumvaringiefolium*), palm grass, asian copperleaf, asoca, sugarcane, bougainville (*Bougainville spectabilis*), Arrow root (*Canna edulis*), canna lily (*Canna indica*), white mulberry (*Morus alba*), apple, *putihan*, snake plant, *endogan*, orange (*Citrus sp*), amethyst flower, cypress or *cemorolondo*, tamarillo, hibiscus (*Hibiscustiliaceus*), and Tengger spikes (*Cyatheatenggeriensis*). Similarly, the number of food crop types is more than the non-food crops. Carbohydrate source plants include Tengger's corn varieties (*Zea mays*), arrow root (*Canna edulis*), taro (*Calocasiaesculenta*), elephant ears (*Xanthosoma sagittifolium*), cassava and sweet potatoes (*Ipomoea batatas*) while the vegetable types include potatoes (*Solanumtuberosum*), cabbage (*Brassica sp*), chinese cabbage, and *tropong* (*Allium sp*).

Crops cultivated at homes in both villages include medicinal plants, vegetables, fruits, spices, starch producers, and several species of ornamental plants, whereas non-food crops are generally ornamental plants and others (Fig. 7.). The plants are useful as vegetables, medicines, or cooking spices, as well as for traditional ceremonial rituals.

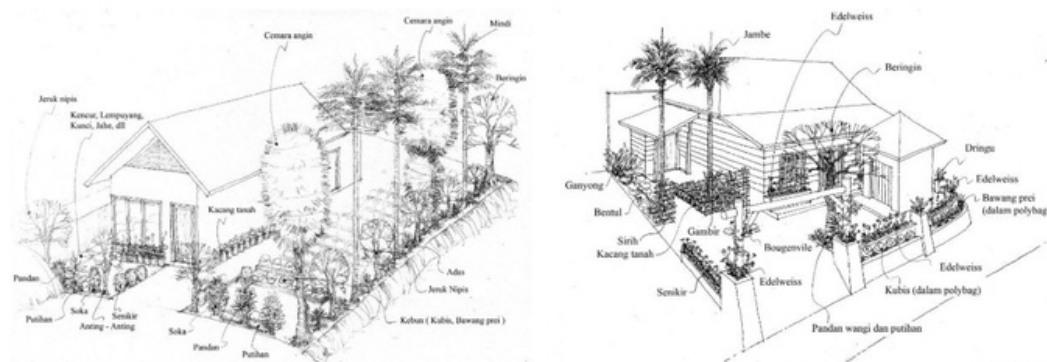


Fig. 7. Biodiversity Example of yard in Ngadas village and Ranu Pani village

Medicinal plants serve as the cure of 60 symptoms of disease in Tengger society such as sweet flag (*Acoruscalamus*), *dadap* leaves, fennel (*Foeniculumvulgare*), garlic (*Allium sativum*) to cure fever, colds, and bloating. Angel trumpet's flower bud (*Brugmansia candida*) can be used for eye pain medication. Peach (*Prunuspersica*) and *kayu ampet* to cure diarrhea; ciplukan fruit (*Physalis minima*), the sap of banana trees and rhizoma *alang-alang* to cure wound; and *tepung otot* plant (*Stellariasaxatilis*), *suripandak* (*Plantago mayor*) for sprains. To relieve bowel movements and canker sore there are papaya (*Carica pubescent*), *grunggung*, *pulosari* (*Alyxiareinwardtii*), *calingan* (*Rubusrosaefolius*), radish (*Raphanussativus*), black mustard (*Brassicasp*), cajuput tree (*Melaleucaleucadendron*), Banana (*Musa paradisiaca*), *Lombok udel* (*Solanumcapicastrum*), *ganyong* (*Canna edulis*), *Calocasiaesculenta*. *Sempreta* root (*Eupatorium sp*), ginger (*Zingiberofficinale*), turmeric, keningar peel, *jahewono*, *kencur* (*Kaempferia galangal*), *purwoceng*, *mlandingan* fruit, *ketirem*, *lombok terong*, and *ranti* are used to increase body vitality.

The variety of spice, dye and beauty plants includes betle nut (*jambe*, *gambir*, *betel*, *injet*) and spices such as coriander, garlic, leek, shallot, and jatropha. Dyeing plants include turmeric, *denges* (*Hibiscus tiliaceus*), and coconut charcoal. For beauty purposes, they have rice flour (*Oriza sativa*), gambier, coconut oil (*Cocosmucifera*), and rose (*Rosa hybrida*). The dye type plant for Tengger society has been passed on for generations and mainly used to chew betle nut (*gambir*, *sirih*, *injet*), but now it has shifted to modern materials, both men and women smoke.

Ritual and magical plants in the yard possess a very important meaning for the life of Tengger people related to custom and culture. Tenggerese customary rituals include custom events related to individual life such as births, marriage, deaths as well as customary events related to agriculture, establishing houses, nature, and environmental phenomena. Tengger community owns a unique custom, distinctly different from the community of Java, as well as distinctive religion and belief resulted in a different Balinese Hindu religion. *Dukun Pandhita* is not only the traditional leader but also the head of Hindu and Buddhist religion and is highly respected by the people of Tengger. Utilization of biodiversity is related to the implementation of traditional rituals. Meditation rituals conducted by Tengger society is an interesting cultural result and should be conserved to enrich the unique culture of the archipelago. It is also a social capital which is sustainable and has become a tourism asset. Such a study of ethnobotany is done also by *Palit* [7] in the Lepcha community of Darjeeling and Sikkim in the vast plains of India.

The implementation of *Kasada* customary ritual is centered on *Pura Poten* where the

Tengger tribe utilizes the diversity of cultivated species (*tandurtuwuh*) based on the desire of each person to be presented to the crater of Mount Bromo so that all good wishes in agriculture, livestock, health and family peace can be granted by *Sang Hyang Widhi*. Types of offerings include chicken (*Gallus gallus*), *dandanan pras*, *liwet* rice (*Oriza sativa* L.) wrapped in banana leaves (*Musa paradisiaca* L.), ylang flower, *tanalayu* flower, *putihan*, *senikir*, *boreh* flower (*ylang*, *sundel*, *bougenville*, *Pandan perfume*, *asoca*). While *Ongkek* is made from bamboo or pine wood as carrying tool, equipped with various kinds of ornamental plants and vegetables, including: banana stem with flowers and fruit, banana, jambe flower and its fruit, young coconut, *nyangkuh* leaves, stems and leaves of *piji*, Sugarcane leaf (*Saccharum officinarum*), *senikir* flower, edelweiss, paddy flower, corn flower, vegetables such as red bean, potato, squash, leek, sweet potato, apple, and various traditional snacks.

Ritual offerings related to the establishment of a house which called *leliwet* include: roasted chicken or *ingkung* (*Gallus-gallus*), two young coconuts being tied up together (*Cocos nucifera*), Jambe (*Areca catechu*) with flower cob, a bunch of banana (*Musa paradisiaca*), mawar (*Rosa sp*), the stems and leaves of banyan tree (*Ficus benyamina* L), *asoca* flower (*Ixorapaludosa* Kurz), pandan leaves (*Pandanus amaryllifolius*) cut into small pieces, gladiolus flower (*Canna hybrida*), jatropha seed (*Ricinus communis* L), *Oriza sativa* L), if there is no rice it can be replaced with grains of corn, *kupat* from rice and young coconut leaf (*Cocos nucifera*), *lepet* from banana leaves that can be filled with rice or corn, jugs, and traditional foods placed on bamboo tray like *wajik*, *tetel*, *pasung*, *pepes* and one set of men's and women's clothing.

Preservation Recommendations

Preservation in this case is reactualizing a sustainable local intelligence and local wisdom in Tengger Tribe yard landscape that reside in the pockets of TNBT (Ngadas and Ranu Pani Villages). Tenggerese yard landscape in the village of Ngadas and Ranu Pani is still not able to support the household's food needs. The disability is due to the size of the yard which is <120m², thus limiting the strata variety and function [12]. It is recorded that 67.7% of the yard in the village of Ngadas and 66.7% in the village of Ranu Pani are categorized as narrow yard.

Since almost all the yards in the village of Ngadas and Ranu Pani are narrow-sized category, a model of narrow yard conservation can be implemented to stimulate the improvement of local wisdom, with complete zonation and plant strata based on Tenggerese culture, with the number of plants ranging from 15 to 20 species. The front and back yard zones should be wider than the side zones, allowing greater open space in public areas and service areas.

Tenggerese's yard landscape conservation can be implemented by modeling the yard in some houses of Ngadas and Ranu Pani Villagers by enriching and strengthening the characteristic and diversity of BTSNP's unique plant as its filler. Typical Tengger tribe plants can be planted for the pilot project, which is equipped with elements of architectural design such as the name and information of each individual plants and visuals - the images that make it easier to recognize typical plants of Tenggerese culture that is already rare or extinct.

The emphasis on wiser utilization of yard is needed to make an agroecosystem-based yard and at the same time to preserve Tenggerese culture, as well as to reward the yard that preserves nature, culture and local wisdom of the Tengger Tribe. Merging several narrow yards will increase the number and type of plants. This is inline with Subadyo's conclusion [15] in his research about the environmental management system(EMS), that takes into account to aspects of environmental sustainability (ecology), the economic activity sustainability and social culture stability.

Conclusions

Based on analysis and discussion results, it can be concluded that:

- The yard landscape in the villages of Ngadas and Ranu Pani is generally narrower in size, which is <120m², and only few yards (<15%) own complete zones (front, right-left, and back).
- Household products of both villages in BTSNP (Ngadas and Ranu Pani) pockets are dominated by horticultures, spices, starches, vegetables, medicinal and food products, so the utilization is still limited merely for daily needs and ceremonial/ religious ceremonies, none of the products is on sale.
- The utilization of front yard by Tengger Tribe community in Ngadas and Ranu Pani is mainly for ritual activities of traditional ceremony, community socialization, and children's playground which correlates with natural conditions, as well as giving life meaning.
- Recommended action plan to maintain and improve local intelligence and wisdom, strengthen the character of yard, and preserve Tenggerese culture in BTSNP pocket is by making some houses' yards as the model of agroecosystem-based yard conservation with the emphasis on Tengger tribe's typical plants.

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